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WE CLAIM:

- 1) A fastener for use in surgery comprising: a body having a base and a leg extending from said base; said body having a width dimension; said leg having a pointed end, an unformed length dimension measured from said base to said pointed end,  
5 and a formed length dimension measured between said base and an end, with the end located between the pointed end and said base and being defined by cutting the leg; and the unformed length being greater than the formed length.
- 2) A fastener for use in surgery comprising: a body having a  
10 base and a leg extending from said base; said body having a width dimension; said leg having a pointed end, an unformed length dimension measured from said base toward said pointed end, and a formed length dimension measured between said base and an end, with the end located between the pointed end and  
15 said base; and the unformed length being greater than the formed length.
- 3) A fastener for use in surgery comprising: a body having a base and a leg extending from said base, said leg having a pointed end and a length measured from said base, said length  
20 being indeterminate.
- 4) The fastener defined in Claim 3 wherein said base has a width dimension and the length dimension of said leg is more than five times said width dimension.
- 5) A wire fastener for use in minimally invasive surgery  
25 comprising: a U-shaped body having a base and two legs extending from said crown; said body having a width dimension measured from one leg to the other; each leg having a pointed end and a length dimension measured from said base to the pointed end thereof; the length dimension of each leg being  
30 greater than said width dimension by a factor of five or more.
- 6) A fastener for use in minimally invasive surgery comprising: a body having a base and a leg extending from said base; said body having a width dimension; said leg having a

pointed end, an unformed length dimension measured from said base to said pointed end, and a formed length dimension measured between said base and an end, with the end located between the pointed end and said base and being defined by cutting the leg; and the unformed length being greater than the formed length.

7) The fastener defined in Claim 5, wherein the length dimension of said leg is greater than said width dimension by a factor of ten or more.

8) The fastener defined in Claim 5, wherein the length dimension of said leg is greater than said width dimension by a factor of one hundred or more.

9) The fastener defined in Claim 6 where the unformed length is long enough to locate the pointed end of said leg outside a patient when said base is in place inside the patient.

10) The fastener defined in Claim 6 further including means for cutting the leg and for bending the cut leg so the end of said cut leg form a retaining feature, said means engaging the leg.

11) The fastener defined in Claim 9 wherein said means engages the leg on one side of the tissue with the base of said fastener being located on another side of the tissue whereby the tissue is located between said leg end and the base of said fastener.

12) The fastener defined in Claim 6 wherein said leg is J-shaped adjacent to said base.

13) The fastener defined in Claim 6 wherein said pointed end includes a needle tip swaged on said pointed end.

14) The fastener defined in Claim 6 wherein said fastener

includes two legs.

15) The fastener defined in Claim 6 in which the base of said fastener includes an arcuate perimeter.

5 16) The fastener defined in Claim 6 wherein the width is the longest dimension of the base of said fastener.

17) The fastener defined in Claim 6 in which said fastener is formed of composite materials.

18) The fastener defined in Claim 6 in which said leg is one material and said base is a different material.

10 19) The fastener defined in Claim 18 in which said one material includes suture material.

20) The fastener defined in Claim 19 in which said base is hollow.

15 21) A method of placing a fastener in a patient during surgery comprising:

providing a fastener for use in surgery having a body having a base and a leg extending from said base, said leg having a pointed end and a length measured from said base, said length being indeterminate;

20 locating the fastener inside a patient on one side of a tissue being operated on;

driving a pointed end of the fastener through the tissue;

grasping the leg after the leg has penetrated the tissue;

25 tensioning the leg and moving the base of the fastener against the tissue;

immobilizing the leg on the other side of the tissue;

engaging the end of the immobilized leg; and

bending the leg to force the end back towards the base of the fastener.

22) The method defined in Claim 21 in which the step of immobilizing the leg is performed by grasping the leg on the side of the tissue opposite that of the base of the fastener whereby the tissue is located between the base of the fastener and any means used to immobilize the leg.

23) The method defined in Claim 22 further including a step of cutting the leg.

24) A method of placing a fastener in a patient during surgery comprising:

providing a fastener for use in surgery having a body having a base and a leg extending from said base, said leg having a point on one end thereof and a length measured from said base, said length being indeterminate;  
locating the fastener inside a patient on one side of a tissue being operated on;  
driving a pointed end of the fastener through the tissue;  
engaging the fastener only at the leg after the leg has penetrated the tissue;  
tensioning the engaged leg and moving the fastener until the base of the fastener moves against the tissue;  
engaging the end of the immobilized leg; and  
bending the leg to force the end back towards the base of the fastener.

25) A method of placing a fastener in a patient during surgery comprising:

providing a fastener for use in surgery having a body having a base and a leg extending from said base, said leg having a point on one end thereof and a length measured from said base, said length being indeterminate;  
locating the fastener inside a patient on one side of a tissue being operated on;  
driving a pointed end of the fastener through the tissue;  
using only the leg of the fastener, moving the fastener into position and forming the fastener.

26) A method of placing a fastener in a patient during minimally invasive surgery comprising:

providing a fastener having a body with a formable portion and having a base and a leg extending from said base; said body having a width dimension; said leg having a pointed end, an unformed length dimension measured from said base to said pointed end, and a formed length dimension measured between said base and an end, with the end located between the pointed end and said base and being defined by cutting the leg; and the unformed length being greater than the formed length;

locating the fastener inside a patient on one side of a tissue being operated on;

driving the pointed end through the tissue;

grasping the leg after the leg has penetrated the tissue; tensioning the leg and moving the base of the fastener against the tissue;

immobilizing the leg on the other side of the tissue;

cutting the leg to form the end;

engaging the end of the immobilized leg; and bending the leg to force the end back towards the base of the fastener.

27) The method defined in Claim 26 including placing a pledget on the fastener adjacent to the base.

28) The method defined in Claim 26 including placing a prosthesis on the fastener from the pointed end and moving the prosthesis on the fastener leg into position adjacent the tissue.

29) The method defined in Claim 26 including grasping the tissue prior to driving the pointed end through the tissue.

30) The method defined in Claim 26 including placing a plurality of fasteners.



31) The method defined in Claim 30 including a step of organizing the fasteners.

5 32) The method defined in Claim 26 including a step of rotating the fastener while the fastener is penetrating the tissue.

33) A tool for use in placing a fastener during surgery comprising:

a body;

a handle on one end of the body of said tool;

10 a track on the body of the tool for slidably holding said fastener on the body of said tool;

means for forcing the fastener along the body of the tool toward tissue being penetrated;

15 means for guiding the pointed end of said fastener through a patient's tissue;

means for grasping the pointed end after the pointed end have exited the tissue; and

means for drawing the base of the fastener against the tissue.

20 34) The tool defined in Claim 33 in which said means for drawing the base of the fastener against the tissue also draws the fastener leg out of the patient.

35) The tool defined in Claim 34 further including means for supporting the leg after it has been drawn through the tissue.

25 36) The tool defined in Claim 35 further including means for covering the point on the fastener leg after the leg has been drawn through the tissue.

30 37) In combination with a fastener for use in surgery which comprises: a body having a base and a leg extending from said base, said leg having a pointed end and a length measured from said base, said length being indeterminate, a tool comprising:

a body;

a handle on one end of the body of said tool;

a track on the body of the tool for slidably holding said fastener on the body of said tool;

5 means for forcing the fastener along the body of the tool toward tissue being penetrated;

means for guiding the pointed end of said fastener through a patient's tissue;

10 means for grasping the pointed end after the pointed end have exited the tissue; and

means for drawing the base of the fastener against the tissue.

38) In combination with a fastener for use in minimally invasive surgery which comprises: a body having a base and a leg extending from said base; said body having a width  
15 dimension; said leg having a pointed end, an unformed length dimension measured from said base to said pointed end, and a formed length dimension measured between said base and an end, with the end located between the pointed end and said base and  
20 being defined by cutting the leg; and the unformed length being greater than the formed length, said tool comprising:

a body;

a handle on one end of the body of said tool;

25 a track on the body of the tool for slidably holding said fastener on said body;

means for forcing the fastener along the body of the tool toward tissue being penetrated;

means for guiding the pointed end of said fastener through a patient's tissue;

30 means for grasping the pointed end after the pointed end have exited the tissue; and

means for drawing the fastener leg out of the patient.

39) The tool defined in Claim 38 wherein said track is disposable and is releasably held on the body of said tool.



40) The tool defined in Claim 38 further including means for rotating the fastener as it is penetrating the tissue.

41) The tool defined in Claim 39 further including a lever on the tool body and a rod connected to said lever and extending toward the handle of the tool body, and means on said lever for releasably grasping the fastener adjacent to the pointed end thereof.

42) The tool defined in Claim 38 further including a fastener driver mechanism on the end of the body of the tool, said fastener driver mechanism including a one-way pawl and a spring.

43) The tool defined in Claim 38 further including means for grasping tissue, said means for grasping tissue including a first jaw and a second jaw, each jaw being mounted on one end of a jaw actuating rod which extends toward said handle.

44) The tool defined in Claim 38 further including a point protector on the fastener.

45) The tool defined in Claim 38 further including an operating mechanism on the handle.

46) A termination tool for use in placing a fastener during surgery comprising:

a body;

a handle on one end of the body of said termination tool; means on the body of the termination tool for

immobilizing the fastener;

means on the body of the termination tool for cutting the leg of said fastener; and

means on the body of said termination tool for bending the cut leg toward the base of the fastener.

47) A termination tool for use in placing a fastener during

surgery, the fastener having a leg of indeterminate length and being forced through tissue during surgery, the termination tool comprising:

a body;

- 5 a handle on one end of the body of said termination tool;  
means on the body of the termination tool for engaging only the leg of the fastener after the leg has been forced through the tissue and immobilizing the fastener and defining an end of the leg and bending the leg into a retaining  
10 position, said means engaging the leg of the fastener on the side of the tissue opposite to the base of the fastener.

- 48) In combination with a fastener for use in minimally invasive surgery which comprises: a body having a base and a leg extending from said base; said body having a width  
15 dimension; said leg having a pointed end, an unformed length dimension measured from said base to said pointed end, and a formed length dimension measured between said base and an end, with the end located between the pointed end and said base and being defined by cutting the leg; and the unformed length  
20 being greater than the formed length, a termination tool comprising:

a body;

- a handle on one end of the body of said termination tool;  
means on the body of the termination tool for  
25 immobilizing the fastener;  
means on the body of the termination tool for cutting the leg of said fastener; and  
means on the body of said termination tool for bending the cut leg toward the base of the fastener.

- 30 49) The tool defined in Claim 47 wherein said means for immobilizing the leg of the fastener includes a first element on one end of a first element actuating rod and a second element on one end of a second element actuating rod, said actuating rods extending toward said handle and being movable  
35 with respect to each other whereby said first and second

elements can be moved with respect to each other.

50) The tool defined in Claim 49 further including a leg receiving aperture defined in said first elements, said leg being received in said aperture and locked between said first and second elements when said first and second elements are oriented a leg grasping configuration next to each other.

51) The tool defined in Claim 50 further including means on said handle for operating said actuating rods.

52) The tool defined in Claim 48 wherein said means on the body of said termination tool for bending the cut leg toward the base of the fastener includes a returning anvil surface located to engage the leg and a body having said anvil surface thereon and extending toward said handle.

53) The tool defined in Claim 52 wherein said handle includes means for moving the body having said anvil surfaces thereon.

54) The tool defined in Claim 48 wherein said means on the body of the termination tool for cutting the leg of said fastener includes a shearing shoulder, and a cutter mechanism.

55) The tool defined in Claim 54 wherein said cutter mechanism includes a sleeve movably located on the body of said termination tool and having one end located near the shearing shoulder and extending toward said handle, a cutting element having a cutting edge on one end located near said shearing shoulder and a cutter body located inside said sleeve.

56) The tool defined in Claim 55 further including a guiding shoulder located on said cutting element to be engaged by said sleeve and shaped to move said cutting edge towards said shearing shoulder when said sleeve engages said guiding shoulder and is forced toward said shearing edge.

57) The tool defined in Claim 52 wherein said anvil and said cutter are one piece.

58) The tool defined in Claim 59 wherein said first and second elements are shaped to increase grasping force on the leg as  
5 the first and second elements are moved closer to each other.